Open Thesis (SA,MA)

MPC for obstacle aided locomotion of snake robots

Description:
During obstacle aided locomotion, a snake robot uses contact points with the environment (obstacles) to push itself forward. This strategy is motivated by the behaviour of biological snakes, which move through cluttered terrain by adapting a sinusoidal body shape and pushing themselves forward utilizing irregularities in the ground.

In this thesis, an MPC based control strategy for snake robots moving in cluttered environment is to be developed and implemented. The predictive nature of MPC allows the robot to move foresightfully while exploiting the present obstacles.

Note: This thesis may include an exchange stay within the ERASMUS program at the NTNU in Trondheim, Norway to perform practical experiments.

Prerequisites:
- Lecture Konzepte der Regelungstechnik
- Lecture Model Predictive Control (ideally)
- Experience in Matlab & Simulink
- Experience with numerical optimization toolboxes, e.g., ACADO, CasADi (ideally)

Supervisor:
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Area:
MPC
Robotics
Numerical Optimization

Properties:
Type: SA,MA
30% Literature & Theory
30% Implementation
20% Simulation
20% Experiments

Beginning:
April 2018

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama